Registration of GSTN SMS Service Qualifier
draft-wilde-sms-service-04

Abstract

This memo describes the registration of the Short Message Service (SMS) as a registered IANA service selector for Global Switched Telephone Network (GSTN) numbers. SMS is not available for all GSTN subscribers, but it has proven very popular with users of the Global System for Mobile Communications (GSM), and has also been adapted to other telephone network technologies such as the Integrated Services Digital Network (ISDN).
Table of Contents

1. Introduction ............................................. 3
1.1 What is GSM? ........................................... 3
1.2 What is SMS? ........................................... 3
  1.2.1 SMS content ........................................ 3
  1.2.2 SMS infrastructure .................................. 4
  1.2.3 SMS Telematic Interworking .......................... 5
2. IANA registrations ........................................... 6
  2.1 IANA registration form for GSTN address service-selector
      "SMS" .................................................... 7
  2.2 IANA registration form for GSTN address qualit-type1
      keyword "SMSC" and value ............................... 7
  2.3 IANA registration form for GSTN address qualit-type1
      keyword "PID" and value ................................ 9
3. Security Considerations .................................... 10
4. Change Log ................................................ 11
  4.1 From -00 to -01 ....................................... 11
  4.2 From -01 to -02 ....................................... 11
  4.3 From -02 to -03 ....................................... 11
  4.4 From -03 to -04 ....................................... 11
Normative References ......................................... 12
Non-Normative References .................................... 12
Author’s Address ........................................... 13
A. Where to send Comments .................................. 13
B. Acknowledgements ....................................... 13
Intellectual Property and Copyright Statements .............. 14
1. Introduction

The capitalized key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

1.1 What is GSM?

GSM (Global System for Mobile Communications) is a digital mobile phone standard which is used extensively in many parts of the world. First named after its frequency band around 900 MHz, GSM-900 has provided the basis for several other networks utilizing GSM technology, in particular GSM networks operating in the frequency bands around 1800 MHz and 1900 MHz. When referring to "GSM" in this document, we mean any of these GSM-based networks that operate a short message service.

1.2 What is SMS?

The Short Message Service [SMS] is an integral part of the GSM network technology. It has been very successful and currently is a major source of revenue for many GSM operators. SMS as a service is so successful that other Global Switched Telephone Network (GSTN) technologies have adapted it as well, in particular the Integrated Services Digital Network (ISDN). Because of this development, this memo uses the term "SMS client" to refer to user agents who are able to send and/or receive SMS messages.

1.2.1 SMS content

GSM SMS messages are alphanumeric paging messages that can be sent to and SMS clients. SMS messages have a maximum length of 160 characters (7-bit characters from the GSM character set [SMS-CHAR]), or 140 octets. Other character sets (such as UCS-2 16-bit characters, resulting in 70 character messages) MAY also be supported [SMS-CHAR], but are defined as being OPTIONAL by the SMS specification. Consequently, applications handling SMS messages as part of a chain of character processing applications MUST make sure that character sets are correctly mapped to and from the character set used for SMS messages.

While the 160 character variety for SMS messages is by far the most widely used one, there are numerous other content types for SMS messages, such as small bitmaps ("operator logos") and simple formats for musical notes ("ring tones"). However, these formats are proprietary and are not considered in this memo.
SMS messages are very limited in length (140 octets), and the first versions of the SMS specification did not specify any standardized methods for concatenating SMS messages. As a consequence, several proprietary methods were invented, but the current SMS specification does specify message concatenation. In order to deal with this situation, SMS clients composing messages SHOULD use the standard concatenation method based on the header in the TP-User Data field as specified in [SMS]. When sending a message to an SMS recipient whose support for concatenated messages is unknown, the SMS client MAY opt to use the backwards-compatible (text-based) concatenation method defined in [SMS]. Proprietary concatenation methods SHOULD NOT be used except in closed systems, where the capabilities of the recipient(s) are always known.

1.2.2 SMS infrastructure

SMS messages can be transmitted over an SMS client’s network interface using the signalling channels of the underlying GSTN infrastructure, so there is no delay for call setup. Alternatively, SMS messages MAY be submitted through other front-ends (for example such as Web services), which makes it possible for SMS clients to run on computers which are not directly connected to a GSTN network supporting SMS.

SMS messages sent as with the GSTN SMS service MUST be sent as class 1 SMS messages, if the client is able to specify the message class.

1.2.2.1 SMS Centers

SMS messages are stored by an entity called Short Message Service Center (SMSC), and sent to the recipient when the subscriber connects to the network. The number of a cooperative SMSC must be known to the SMS sender (ie, the entity submitting the SMS message to a GSTN infrastructure) when sending the message (usually, the SMSC’s number is configured in the SMS client and specific for the network operator to which the sender has subscribed). In most situations, the SMSC number is part of the sending SMS client’s configuration. However, in some special cases (such as when the SMS recipient only accepts messages from a certain SMSC), it may be necessary to send the SMS message over a specific SMSC.

Short messages can be mobile terminated (MT) or mobile originated (MO). MT messages are the ones that arrive at SMS clients; MO messages are sent by SMS clients. Networks may support either, both, or none of these. For the purpose of this memo, it is important that the sending SMS client is allowed to submit MO messages, and that the receiver is allowed to receive MT messages.
The exact setup of message submission and delivery is not subject of this memo, it may incorporate additional hops in addition to the pure SMS transport. For example, the sending SMS client may use a Web service to submit the SMS message, and the receiving SMS client may be set up to forward the SMS to an email account. For the purpose of this memo, it is important that the receiver can be addressed by a GSTN number, and that the sender can submit an SMS message using this number.

1.2.3 SMS Telematic Interworking

While in most cases SMS messages are exchanged between SMS clients, the SMS specification also includes provisions for so-called "Telematic Interworking". In this scenario, the SMS message specifies a Protocol Identifier, which identifies the service to which the SMS message has to be submitted. In effect, this implements a gateway functionality in the SMSC.

Telematic Interworking supports a number of services from Fax through Telex and Internet Email up to voice telephone, where the gateway is expected to make a text-to-speech transformation. The set of possible services is defined by the SMS specification [SMS], but network operators are not required to support any of these services. SMS clients SHOULD implement support for Telematic Interworking, which among other things means that users must be able to set the Protocol Identifier field of generated SMS messages. If clients support Telematic Interworking, they MUST indicate to the user the changed semantics of the receiver number (eg, if Fax is selected, the receiver will be contacted via Fax rather than SMS).

In the following list the telematic devices (ie, the services that can be addressed using the Telematic Interworking mechanism) defined by the SMS specification are described. The abbreviations are not taken from the SMS specification, but are introduced by this memo for identifying the device type using an SMS service qualifier keyword.

"IMPL": In this case the device type is implicitly defined, either because the SMS Center knows it, or because it can be concluded on the basis of the address.

"TELEX": Telex device

"G3FAX": Group 3 telefax device

"G4FAX": Group 4 telefax device
"VOICE": Voice telephone (this requires conversion to speech, but there is no mechanism to specify a language)

"ERMES": ERMES (European Radio Messaging System)

"NATPAG": National paging system (this does not specify a specific paging systems but implies that the SMS center knows about a particular national paging system)

"VIDEOTEX": Videotex

telepix: Teletex, either with an unspecified carrier or using PSPDN, CSPDN, PSTN, or ISDN as carrier

"UCI": UCI (Universal Computer Interface)

reserved: 7 combinations are reserved which do not have a specified meaning

"MH": Some message handling facility known to the SMS center (not further specified)

x400: X.400-based message handling system

The SMS specification fails to specify how X.400 OR addresses are actually embedded into SMS messages, so even though there is a Protocol Identifier for X.400, it is impossible to encode the recipient(s) of a message.

email: Internet electronic mail

The recipient(s) of SMS messages gatewayed to Internet electronic mail are specified in the message’s user data in a way defined by the SMS specification.

specific: 7 combinations are defined to have a meaning specific to each SMS center, their usage is based on mutual agreement between SMS clients and the SMS center.

It is important to notice that some of the above devices require additional information to be specified (in particular, the "Internet electronic mail" format). The SMS specification defines the methods how this has to be done (effectively by embedding the email information into the SMS message’s text).

2. IANA registrations

Based on the requirements defined in RFC 3191 [RFC3191], the IANA

Wilde

Expires November 12, 2003

[Page 6]
registration forms for the "SMS" service-selector, and "SMSC" and "PID" qualif-type1 elements are defined here. Syntax definitions are given using the Augmented BNF for Syntax Specifications [RFC2234].

2.1 IANA registration form for GSTN address service-selector "SMS"

To:      IANA@iana.org
Subject: Registration of new values for the GSTN address
         service-selector specifier "SMS"

service-selector name: SMS

Description of Use: SMS - specify that the GSTN address refers to a
GSTN subscriber who is capable of receiving messages using the GSM
Short Message Service (SMS). However, if a "PID" qualif-type1
element is present for this service selector, then the GSTN
address must be interpreted according to the rules for the "PID"
qualif-type1 element’s value (this may also mean that the GSTN
address has to be ignored).

For a complete description refer to RFC 3191 and
draft-wilde-sms-service-04.

Security Considerations: See the Security Consideration section of
draft-wilde-sms-service-04.

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2.2 IANA registration form for GSTN address qualif-type1 keyword "SMSC"
and value

To:      IANA@iana.org
Subject: Registration of new values for the GSTN address
         qualif-type1 element "SMSC"
qualif-type1 "keyword" name: SMSC

qualif-type1 "value" ABNF definition: The ABNF definition for the value of the SMSC keyword is taken from draft-allocchio-gstin-05

sub-addr   = gstin-phone
gstin-phone = ( global-phone / local-phone )
global-phone = "+" 1*{ DIGIT / written-sep }
local-phone = [ exit-code ] dial-number / exit-code [ dial-number ]
ext-code    = phone-string
dial-number = phone-string
phone-string = 1*{ DTMF / pause / tonewait / written-sep }
DTMF        = ( DIGIT / "#" / "*" / "A" / "B" / "C" / "D" )
pause       = "p"
tonewait    = "w"
written-sep = ( "-" / "." )

Description of Use: SMSC - In some situations, it may be necessary to guide the sender of an SMS message to send the message via a certain Short Message Service Center (SMSC). If the SMSC qualif-type1 element is present, an SMS client SHOULD try to send the message first using the specified SMSC. If that fails, the SMS client MAY try another SMSC (such as the default SMSC for that client).

Further description is available in draft-wilde-sms-service-04

Use Restriction: The use of the "SMSC" qualif-type1 element is restricted to the "SMS" service-selector, it has no meaning outside the SMS service defined by the "SMS" service-selector.

Security Considerations: See the Security Consideration section of draft-wilde-sms-service-04.

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2.3 IANA registration form for GSTN address qualif-type1 keyword "PID" and value

To:      IANA@iana.org
Subject: Registration of new values for the GSTN address
        qualif-type1 element "PID"

qualif-type1 "keyword" name: PID

qualif-type1 "value" ABNF definition: The ABNF syntax definition of the PID qualifier is as follows:

```
sub-addr      =  "IMPL" / "TELEX" / "G3FAX" / "G4FAX" / "VOICE"
                / "ERMES" / "NATPAG" / "VIDEOTEX" / teletex / "UCI"
                / reserved / "MH" / "X400" / email / specific
teletex       =  "TELETEX-"
                ( "UNSPEC" / "PSPDN" / "CSPDN" / "PSTN" / "ISDN" )
email         =  "SMTP:" address
reserved      =  "RES" ( "1" / "2" / "3" / "4" / "5" / "6" / "7" )
specific      =  "SPEC" ( "1" / "2" / "3" / "4" / "5" / "6" / "7" )
```

The "x400" definition is functionally incomplete (because there is no way how the actual OR address can be specified), but provided here for completeness.

The "address" definition is taken from RFC 2822 [RFC2822] and specifies an address that may either be an individual mailbox, or a group of mailboxes.

Description of Use: PID - The protocol identifier is used to specify SMS Telematic Interworking by selecting a specific protocol to use for delivery to the recipient.

Further description is available in draft-wilde-sms-service-04

Use Restriction: The use of the "PID" qualif-type1 element is restricted to the "SMS" service-selector, it has no meaning outside the SMS service defined by the "SMS" service-selector.

Security Considerations: See the Security Consideration section of draft-wilde-sms-service-04.

Person & email address to contact for further information:

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3. Security Considerations

SMS messages are transported without any provisions for privacy or integrity, so SMS users should be aware of these inherent security problems of SMS messages. Unlike electronic mail, where additional mechanisms exist to layer security features on top of the infrastructure, there currently is no such framework for SMS messages.

SMS messages very often are delivered almost instantaneously (if the receiving SMS client is on line), but there is no guarantee for when SMS messages will be delivered. In particular, SMS messages between different network operators sometimes take a long time to be delivered (hours or even days) or are not delivered at all, so applications SHOULD NOT make any assumptions about the reliability and performance of SMS message transmission.

In most networks, sending SMS messages is not a free service. Therefore, SMS clients MUST make sure that any action that incurs costs is acknowledged by the end user, unless explicitly instructed otherwise by the end user. If an SMS client has different ways of submitting an SMS message (such as a Web service and a phone line), then the end user MUST have a way to control which way is chosen.

SMS clients often are limited devices (typically mobile phones), and the sending SMS client SHOULD NOT make any assumptions about the receiving SMS client supporting any non-standard services, such as proprietary message concatenation or proprietary content types. However, if the sending SMS client has prior knowledge about the receiving SMS client, then he MAY use this knowledge to compose non-standard SMS messages.

There are certain special SMS messages defined in [SMS] that can be used, for example, to turn on indicators on the phone display, or to send data to certain communication ports (comparable to UDP ports) on the device. Certain proprietary systems (for example, the Wireless Application Protocol [WAP]) define configuration messages that may be used to reconfigure the devices remotely. Any SMS client SHOULD make sure that malicious use of such messages is not possible, for example
by filtering out certain SMS User Data headers. Gateways that accept
SMS messages e.g. in e-mail messages or web forms and pass them on to
an SMSC SHOULD implement this kind of 'firewalling' approach as well.

Because the narrow bandwidth of the SMS communications channel, there
should also be checks in place for excessively long concatenated
messages. As an example, it may take two minutes to transfer thirty
concatenated text messages.

Unchecked input from a user MUST NOT be used to populate any other
fields in a Short Message other than the User Data field (not
including the User Data Header field). All other parts, including the
User Data Header, of the Short Message should be generated by trusted
means.

4. Change Log

4.1 From -00 to -01

- Added a number of new security considerations.
- Added the "PID" qualif-type1 keyword and the section about "SMS
  Telematic Interworking" Section 1.2.3.

4.2 From -01 to -02

- Removed address specification for X.400 SMS from ABNF
  (surprisingly not part of the SMS spec).
- Added some explanatory text about character set mapping for SMS
  messages.
- Added text requiring the use of message class 1 for sending SMS
  messages.

4.3 From -02 to -03

- Changed ordering of "change Log" section (descending to
  ascending).
- Fixed some spelling erros.

4.4 From -03 to -04

Wilde
Expires November 12, 2003
[Page 11]
Updated reference to draft-allocchio-gstn (to revision -05)

Normative References


Non-Normative References


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Appendix A. Where to send Comments

Please send all comments and questions concerning this document to Erik Wilde.

Appendix B. Acknowledgements

This document has been prepared using the IETF document DTD described in RFC 2629 [RFC2629].

Thanks to Claudio Allocchio and Antti Vaha-Sipila for their comments.
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Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.